

### **REMARKS**

Applicant sincerely thanks Examiners Siefke and Warden for the personal interview granted Applicant on June 22, 2004. This Amendment is being filed in furtherance of that interview. By this Amendment, Applicant wishes to supplement the remarks of the Amendment dated June 16, 2004, with (1) copies of Applicant's analysis of the Welle patent and why the Welle patent is not a good reference and does not either anticipate or render obvious Applicant's claims, and (2) copies of Applicant's publications and the publication by Hayes referenced in Applicant's comments on Welle ((1) above). Thus, Applicant incorporates into this Amendment, all of the amendments made and all of the remarks of the Supplemental Amendment dated June 16, 2004, as if they were reproduced herein.

### **APPLICANT'S ANALYSIS OF THE WELLE PATENT**

The patent issued to Welle does not teach or suggest Applicant's method. The patent issued to Welle teaches a method for retroactively identifying a substance by adding a taggant to the substance. Welle uses controlled abundance ratios of multiple isotopes in each of one or more elements of the taggant to retroactively identify the substance. Applicant does not use taggants, or artificially controlled abundance ratios of isotopic concentrations. The abundance ratios of the isotopes of the taggant elements are measured by suitable means to determine the identification code of the tagged substance and to compare the artificially controlled ratios to the naturally occurring abundance ratios (which are relatively imprecise) to identify the substance. Abstract, column 1, lines 16-26.

Welle, in retrospectively identifying a substance, analyzes only the taggant elements to

determine the artificially controlled abundance ratios of those elements in the substance. Applicant has no taggant. Welle does not analyze the naturally occurring stable isotopes of the substance in their unaltered concentrations. Applicant does. In fact, in performing Welle's method, Welle is only concerned with the isotopes of the taggant elements as he uses enormously large taggant concentrations (typically hundreds or more than a standard deviation unit over any expected background concentration) to hide the error of his comparison of abundance ratios. Welle is totally unconcerned with and teaches against using the isotopes of the substance to be retroactively identified. Welle does not analyze any of the anthropogenetically unaltered, naturally occurring, stable isotopes of the substance to be retroactively identified in performing his method, as does Applicant.

Welle utilizes artificially controlled abundance ratios of the isotopes of the taggant for the identification code of the tagged product. Applicant's method does not use artificially controlled abundance ratios of the isotopes for anything. Column 1, lines 30-39.

In Welle, unique, or exotic taggants, exclusively heavy isotopes, corresponding to unique identification codes, are created by mixing controlled combinations of ratios of multiple stable unique or exotic isotopes of one or more elements of the taggant. The resultant mixture is added to the substances to be later retroactively identified in amounts enormously larger than a standard deviation unit over any expected background concentration. When identification is required, the isotope abundance ratios of the taggant elements are measured and compared to the published naturally occurring abundance ratios of the isotopes.

Applicant does not add anything to the substance to be retroactively identified.

Applicant does not utilize artificially controlled abundance ratios of any isotopes to retroactively identify the substance. Applicant does not use unique or exotic materials to retroactively identify the substance. Applicant utilizes the naturally occurring, stable, commonly occurring (not unique) isotopes of the product to be identified. In most applications, Applicant uses common, ordinary elements such as carbon, oxygen, sulfur, nitrogen, and/or hydrogen for his identification.

Welle uses exotic elements generally uncommon to the substance such as europium, neodymium, and the like. Welle utilizes the abundance ratio of multiple isotopes of a single element because (1) the abundance ratios can be more precisely measured than abundance ratios of multiple elements or compounds and (2) as Welle asserts that the abundance ratios will not be modified by the non-nuclear, physical or chemical processes except those specifically designed for isotope separation, so that the taggant code will not be destroyed by chemical reactions or explosions which has been shown by *Hayes*, 2004 to be untrue. Column 1, line 15 through column 2, line 24. In contrast, Applicant utilizes the analyses of “isotopes of a plurality of naturally occurring stable isotopes of said product.”

Welle provides a system in which the abundance ratio of two or more isotopes in each of one or more elements added to a substance is artificially controlled to provide a means for retrospective identification of the substance. Welle uses as an example of europium isotopes having atomic masses of 151 and 153 which can be formulated into taggants having unique abundance ratios of 5/95, 15/85, 25/75, 35/65, 45/55, 55/45, 65/35, 75/25, 85/15 and 95/5 and assigned to specific batches. These abundance ratios can then be utilized to retroactively identify

substance from each of these batches. In natural europium, these isotopes are found in a ratio of approximately 47.77/52.23. Welle teaches that with the use of a single pair of isotopes of a single element, at least 100 unique abundance ratios can be readily constructed. A significant increase in the number of possible unique codes may be achieved by utilizing more than one pair of stable isotopes in creating the code. Such is a code utilizing additions of europium, neodymium, which also has two isotopes and dysprosium which also has two isotopes typically in amounts enormously greater than a standard deviation unit more than the expected background. Table III of Welle illustrates these abundance ratios. Column 2, line 26 through column 3, line 63.

Europium, neodymium, and dysprosium are examples of Welle's unique or exotic taggants not naturally found in the substance to be retroactively identified. Welle does not utilize the naturally occurring stable isotopes of the product to be retroactively identified as does Applicant. Welle does not utilize the isotopes of common, ordinary elements such as hydrogen, oxygen, sulfur, and/or nitrogen as does Applicant. The Examiner is in error in suggesting that Welle teaches or suggests the use of a taggant comprising the isotopes of hydrogen to retroactively identify an organic substance having hydrogen therein. While Welle is concerned with background contamination, the only background contamination that Welle is concerned with is background contamination found in the environment to which the tagged substance is exposed, i.e., a bullet tagged with europium fired into a substance containing europium. Welle teaches that such background contamination should be avoided as such background contamination could possibly render the taggant code unreadable. Welle proposes a solution to

the difficulty in determining what fraction of the taggant element present in the substance is derived from the environment and what fraction of the taggant element present in the substance is derived from the taggant by preparing a taggant with multiple isotopes of an element which has at least three stable isotopes so that one or more of the stable isotopes of the element can be reserved as an indicator of background contamination. The manner in which the environmental background contamination can be dealt with is clearly shown by the example of utilizing the natural occurring isotopes of neodymium in column 4, lines 17 through column 5, line 24. However, Welle incorrectly assumes that the naturally occurring abundance ratios and background contamination are constant. Thus, Welle can never retroactively identify a substance with the precision of Applicant unless he uses enormous amounts of taggant.

Welle further would never utilize isotopes of any element contained in the substance to be retroactively identified as the taggant and teaches against such a taggant. The use of such a taggant would not only impossibly complicate Welle's retroactive identification and the retroactive reading of the taggant code he proposes. (Column 3, line 66 through column 4, line 16), but would require Welle to use enormously large amounts of taggant (typically hundreds or more than a standard deviation unit) to overcome error of the naturally occurring abundance ratios, the background of both the substance to be retroactively identified and the environmental background, and to always reserve at least one isotope as an indicator of background contamination.

Applicant is not concerned with environmental contamination or background contamination at all. Applicant's method, in the words of Claim 17, comprises:

“(1) analyzing for the concentration of a plurality of naturally occurring stable isotopes of a substance in their unaltered concentrations, (2) arranging said concentrations of said isotopes into a mathematical array, (3) forming said mathematical array into a readable form, (4) assembling product information, (5) indexing said product information in said readable form thereby forming an index, and (6) maintaining said index and said product information.”

Then, at a later time when an unknown substance needs to be retroactively identified,

Applicant’s method continues, in the language of Claim 18:

“(1) measure the concentration of one or more isotopes in the unknown substance, (2) compare the concentrations of said one or more isotopes in the unknown substance with the concentrations in said mathematical array in said readable form to identify the substance.”

Welle does not teach or suggest this method. Welle does not analyze any of the naturally occurring stable isotopes of a product in their unaltered concentrations. Welle only analyzes the stable isotopes of taggant elements which he has added to the substance to be retroactively identified. In this regard, Welle specifically utilizes controlled abundance ratios of the isotopes measured. Applicant, in contrast, utilizes the isotope concentrations determined by analysis and placed into Applicant’s mathematical array.

There is nothing in the Welle patent to teach or suggest otherwise. Each of the independent claims of Welle are consistent with the specification requiring the addition to the substance a taggant comprised of at least one element having at least two stable isotopes in a selected artificial isotopic abundance ratio, maintaining a tagging record showing the correlation between the selected isotopic abundance ratio of each element in the taggant in the assigned

identification code of the substance and comparing the results of the measurement of the isotopic abundance ratio of the taggant with the tagging record to identify the substance. See Claims 1, 12, 18, and 24.

In the performance of Applicant's method, it makes no difference as to whether or not the unknown substance is tagged or how it is tagged. In the performance of Applicant's method, Applicant:

1. Analyzes for the concentration of a plurality of naturally occurring stable isotopes of a substance in their unaltered concentrations. Applicant does not tag the substance.
2. Arranges the concentrations of said isotopes into a mathematical array.
3. Forms the mathematical array into a readable form.
4. Indexes the product information and the mathematical array.
5. Maintains the index with both said product information and said mathematical array.

When an unknown substance is to be retroactively identified, the same isotopes as analyzed and placed into the mathematical array and indexed are analyzed in the unknown substance.

A comparison is made of one or more of the concentrations of one or more of the isotopes in the unknown substance with the concentrations in said mathematical array in said readable form to identify the substance.

Thus, if the unknown substance was tagged by the Welle method utilizing unique materials such as europium, Applicant's identification would identify the substance, but would

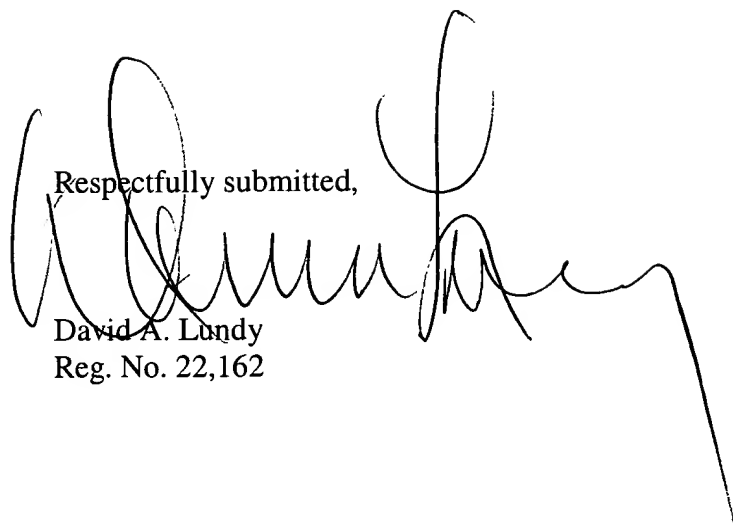
not tell the observer whether or not the unknown substance was tagged. If the unknown substance was hypothetically tagged (not as taught by Welle) by artificially increasing the amount of one or more isotopes in the unknown substance (in an amount which must be greater than one standard deviation unit to distinguish the background) by adding a taggant thereto, either the unknown substance would not be identified if the tagged isotope were one of those measured during Applicant's process, or would be identified by Applicant's process without knowing of the tag if the analyses were made of isotopes not used for tagging the substance.

If a large number of isotopes were placed in the mathematical array and one or more of the isotopes placed in the array were hypothetically used for tagging, the compositions would still be identified, although whether or not the unknown product was tagged or not tagged would not be known unless the tagged isotope were measured

Thus, in either the event of tagging in accordance with the Welle method utilizing unique taggants such as europium or common taggants in accordance with Applicant's hypothetical method, which is not taught or suggested by Welle (hypothetically utilizing one or more of the isotopes found in the unknown composition), Applicant's method can be performed to retroactively identify unknown compositions by analyzing the concentrations of a plurality of naturally occurring stable isotopes of the unknown substance in their unaltered concentrations without regard to taggants.

The patent issued to Welle relates to the retroactive identification of unknowns by isotopes but is not otherwise related to Applicant's method. The patent issued to Welle does not anticipate or obviate Applicant's method as claimed.



Respectfully submitted,  
  
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